



# Canadian National Vegetation Classification (CNVC) Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

Forest / Forêt

Association CNVC00204

***Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp.**  
**Black Spruce / Common Labrador Tea – Sheep Laurel / Reindeer Lichens**  
**Épinette noire / Thé du Labrador – Kalmia à feuilles étroites / Cladonies**

**Subassociations:** 204a *Cladina stellaris*, 204b *Cladina mitis*

**CNVC Alliance:** CA00010 *Picea mariana* / *Vaccinium angustifolium* / *Cladina* spp.

**CNVC Group:** CG0005 Ontario-Quebec Boreal Dry-Mesic Black Spruce – Jack Pine Forest

## Type Description

**Concept:** CNVC00204 is a boreal coniferous forest Association that occurs in Quebec. It has an open tree layer of black spruce (*Picea mariana*) and a dense shrub layer comprising black spruce and abundant ericaceous species, including common Labrador tea (*Rhododendron groenlandicum*), sheep laurel (*Kalmia angustifolia*), velvet-leaved blueberry (*Vaccinium myrtilloides*) and early lowbush blueberry (*V. angustifolium*). Willows (*Salix* spp.) are usually present but not abundant. The herb layer is virtually nonexistent. The moss and lichen layer is continuous and dominated by reindeer lichens (*C. stellaris*, *C. rangiferina* and *C. mitis*). Patches of red-stemmed feathermoss (*Pleurozium schreberi*) and *Cladonia* lichens are also present. CNVC00204 occurs mainly on mesic, nutrient-poor sites in a region with a humid continental boreal climate that becomes increasingly humid eastward. These are among the poorest sites capable of supporting tree-dominated vegetation in the region. The dynamics of CNVC00204 are closely tied to fire, but it can be a stable, self-perpetuating community. Two subassociations are distinguished, *Cladina stellaris* and *Cladina mitis*.

**Vegetation:** CNVC00204 is a coniferous forest Association with an open tree layer of *Picea mariana* and a dense shrub layer comprising *P. mariana* and abundant ericaceous shrubs, especially *Rhododendron groenlandicum* and *Kalmia angustifolia* but also *Vaccinium myrtilloides* and *V. angustifolium*. *Salix* spp. are common in the shrub layer but have low abundance. The herb layer is virtually nonexistent; there are no common species. The moss and lichen layer is continuous and characterized by abundant drought-tolerant lichens, including *Cladina stellaris*, *C. rangiferina* and *C. mitis*, with some *Cladonia* spp. Patches of *Pleurozium schreberi* and minor amounts of *Dicranum* spp. and *Ptilium crista-castrensis* are often present on moister microsites (e.g., shady areas and depressions). Two subassociations are distinguished based on the dominance of lichen species, *Cladina stellaris* and *Cladina mitis*.

**Environment:** CNVC00204 occurs in a boreal climate that is humid and more continental in the western portion of its range, becoming very humid and more maritime in the east. It is found primarily on mesic, nutrient-poor sites; these are among the poorest sites capable of supporting tree-dominated vegetation in this region of the boreal. Stands are typically on level sites or gentle slopes on water-shedding, crest or upper to middle-slope topopositions. On slopes, stands occur more frequently on warmer (often drier) aspects, either west or south-facing. Soils are usually moderately deep to deep, well drained, coarse loams or sands. Surficial materials are usually morainal. Mor humus forms are typical.

CNVC00204 is most common where regional fire cycles are intermediate (100-270 years) or long (270-500 years). These stands may burn more frequently than the regional average.

		Soil Nutrient Regime		
		Poor	Medium	Rich
Soil Moisture Regime	Dry			
	Mesic			
	Moist			
	Wet			



# Canadian National Vegetation Classification (CNVC) Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

## ***Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp. CNVC00204**

### **Type Description (cont'd)**

**Dynamics:** CNVC00204 usually develops on edaphically limited sites where fire is the primary disturbance. *Picea mariana* has thin bark with low tolerance to fire, but its semi-serotinous cones open when heated and disperse seeds, so it is well adapted to recolonize after fire.

CNVC00204 typically occurs on sites that do not support a closed canopy forest, but it can also result from regeneration failure in a closed stand (e.g., CNVC00211 [*Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolia* / *Pleurozium schreberi*]). This could happen when successive fires occur before trees have reached reproductive maturity, when fire follows a spruce budworm (*Choristoneura fumiferana*) outbreak that has diminished the seed crop or viability or when seedling mortality is unusually high. The resulting open canopy promotes an increase in *Cladina* cover. Lichens dry out quickly, becoming a highly flammable and continuous fuel source, contributing to more frequent ignitions and faster-burning, but lower severity fires that perpetuate the openness of the stand. Lichen cover can also inhibit conifer germination and seedling survival.

*Cladina mitis* is an earlier seral lichen species than *C. stellaris*; the *Cladina mitis* subassociation typically describes stands that have burned in the previous 60 years (approximately).

*Kalmia angustifolia* is an aggressive competitor to conifer regeneration. It vigorously sprouts after disturbances that do not eliminate its root system (e.g., low severity fires or harvesting), reducing space available for tree establishment. Its litter may inhibit *P. mariana* seed germination (physically and chemically) and affect seedling growth by reducing available nitrogen and limiting ectomycorrhizal relationships.

**Range:** CNVC00204 occurs in the boreal region of Quebec from the shores of James Bay in the west to the Lower North Shore of the Gulf of Saint Lawrence near the St. Augustine River in the east. Occasionally stands occur farther south, in the northern temperate region, where they are usually restricted to glaciofluvial deposits that are drier than surrounding sites, and/or at higher elevations.

### **Conservation Status (NatureServe)**

**Global Conservation Rank:** no applicable rank

**National Conservation Rank:** not yet determined

**Subnational Conservation Rank:** not yet determined



Canadian National Vegetation Classification (CNVC)  
 Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

Forest / Forêt

Association CNVC00204

*Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp.  
 Black Spruce / Common Labrador Tea – Sheep Laurel / Reindeer Lichens  
 Épinette noire / Thé du Labrador – Kalmia à feuilles étroites / Cladonies

**Distribution**

**Countries:** Canada

**Provinces / Territories / States:** Quebec

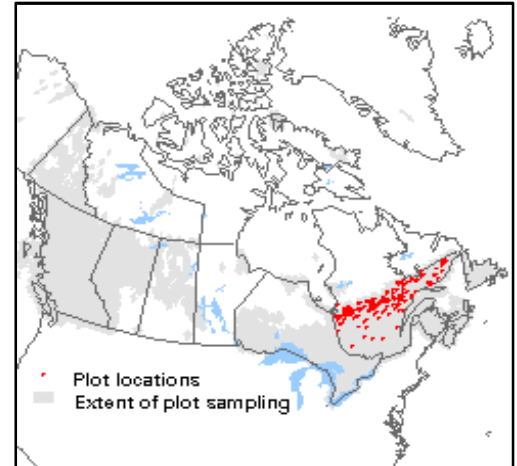
**Terrestrial Ecozones and Ecoregions of Canada:** Boreal Shield: Abitibi Plains, Central Laurentians, Mecatina Plateau, Rivière Rupert Plateau, Southern Laurentians; Hudson Plains: James Bay Lowland; Taiga Shield: Mecatina River, Smallwood Reservoir-Michikamau

**Rowe's Forest Regions and Sections of Canada:** Boreal: Chibougamau-Natashquan, East James Bay, Gouin, Hudson Bay Lowlands, Laurentide-Onatchiway, Missinaibi-Cabonga, Newfoundland-Labrador Barrens, Northeastern Transition, Northern Clay; Great Lakes-St. Lawrence: Algonquin-Pontiac

**NAAEC CEC Ecoregions of North America (Levels I & II):** Hudson Plains; Northern Forests: Mixed Wood Shield, Softwood Shield; Taiga: Taiga Shield

**Nature Conservancy of Canada Ecoregions:** Boreal Shield, Eastern Taiga Shield, Hudson Plains

**Bioclimatic Domains and Subdomains of Québec:** 4 Ouest, 5 Est, 5 Ouest, 6 Est, 6 Ouest



**Corresponding Types and Associations**

<b>204a</b> <i>Cladina stellaris</i>	Quebec	QC007A	<i>Picea mariana</i> / <i>Ledum groenlandicum</i> - <i>Kalmia angustifolia</i> / <i>Cladina</i> spp. [ <i>Cladina stellaris</i> ]
		QC046	<i>Picea mariana</i> - <i>Larix laricina</i> / <i>Cladina</i> spp. - <i>Pleurozium schreberi</i>
<b>204b</b> <i>Cladina mitis</i>	Quebec	QC007B	<i>Picea mariana</i> / <i>Ledum groenlandicum</i> - <i>Kalmia angustifolia</i> / <i>Cladina</i> spp. [ <i>Cladina mitis</i> ]



# Canadian National Vegetation Classification (CNVC) Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

Forest / Forêt

Association CNVC00204

*Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp.

Black Spruce / Common Labrador Tea – Sheep Laurel / Reindeer Lichens

Épinette noire / Thé du Labrador – Kalmia à feuilles étroites / Cladonies

## Vegetation Summary\*

Species Name <sup>†</sup>	Association CNVC00204		Subassociation 204a <i>Cladina stellaris</i>		Subassociation 204b <i>Cladina mitis</i>	
	158 plots		147 plots		11 plots	
	% Cover <sup>±</sup>	% Presence <sup>^</sup>	% Cover <sup>±</sup>	% Presence <sup>^</sup>	% Cover <sup>±</sup>	% Presence <sup>^</sup>
<b>Overstory Trees</b>						
<i>Picea mariana</i>	27	100	27	100	21	100
<i>Pinus banksiana</i>	6	30	6	32	-	-
<i>Populus tremuloides</i>	3	8	3	5	4	36
<b>Tree Stratum Cover (P<sub>10</sub> P<sub>25</sub> Mean P<sub>75</sub> P<sub>90</sub>)<sup>‡</sup></b>	<b>(19 32 35 49 49)</b>		<b>(19 32 36 49 49)</b>		<b>(16 19 26 32 36)</b>	
<b>Understory Woody Shrubs and Regenerating Trees</b>						
<i>Picea mariana</i>	18	100	18	100	15	100
<i>Rhododendron groenlandicum</i>	24	96	24	96	26	100
<i>Kalmia angustifolia</i>	26	88	27	88	23	91
<i>Vaccinium myrtilloides</i>	9	84	9	84	13	82
<i>Vaccinium angustifolium</i>	13	83	12	82	20	100
<i>Salix</i> sp.	4	68	4	68	4	73
<i>Amelanchier</i> sp.	3	43	3	44	3	36
<i>Abies balsamea</i>	4	22	3	19	6	55
<i>Populus tremuloides</i>	3	10	3	9	4	27
<i>Larix laricina</i>	2	9	2	8	2	27
<i>Prunus pensylvanica</i>	2	3	2	1	2	27
<b>Shrub Stratum Cover (P<sub>10</sub> P<sub>25</sub> Mean P<sub>75</sub> P<sub>90</sub>)<sup>‡</sup></b>	<b>(36 66 73 86 99)</b>		<b>(36 66 72 86 99)</b>		<b>(66 70 76 86 86)</b>	
<b>Understory Herbs and Dwarf Shrubs</b>						
<i>Gaultheria hispidula</i>	3	57	3	56	2	64
<i>Cornus canadensis</i>	3	41	3	39	2	55
Poaceae	2	22	2	22	2	18
<i>Chamerion angustifolium</i>	2	11	2	10	2	36
<i>Equisetum</i> sp.	2	4	2	2	2	27
<b>Herb Stratum Cover (P<sub>10</sub> P<sub>25</sub> Mean P<sub>75</sub> P<sub>90</sub>)<sup>‡</sup></b>	<b>(0 0 2 3 3)</b>		<b>(0 0 2 3 3)</b>		<b>(0 0 1 3 3)</b>	
<b>Bryophytes and Lichens</b>						
<i>Pleurozium schreberi</i>	28	100	28	100	22	100
<i>Cladina rangiferina</i>	16	100	15	100	23	100
<i>Cladina stellaris</i>	49	93	51	95	13	64
<i>Dicranum</i> sp.	3	91	3	90	2	100
<i>Cladina mitis</i>	8	84	5	83	41	100
<i>Cladonia</i> sp.	5	69	5	68	4	82
<i>Ptilium crista-castrensis</i>	3	61	3	63	2	27
<i>Ptilidium ciliare</i>	4	58	4	62	3	9
<i>Polytrichum</i> sp.	2	37	2	37	3	36
<i>Sphagnum fuscum</i>	4	36	4	35	3	45



***Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp.  
 CNVC00204**

**Vegetation Summary (cont'd)\***

Species Name <sup>†</sup>	Association CNVC00204		Subassociation 204a <i>Cladina stellaris</i>		Subassociation 204b <i>Cladina mitis</i>	
	% Cover <sup>‡</sup>	% Presence <sup>^</sup>	% Cover <sup>‡</sup>	% Presence <sup>^</sup>	% Cover <sup>‡</sup>	% Presence <sup>^</sup>
<i>Sphagnum</i> sp.	4	28	4	27	3	36
<i>Cladina</i> sp.	2	7	2	7	-	-
<b>Bryo-Lichen Stratum Cover</b> (P <sub>10</sub> P <sub>25</sub> Mean P <sub>75</sub> P <sub>90</sub> ) <sup>‡</sup>	(90 90 89 90 90)		(90 90 90 90 90)		(90 90 88 90 90)	

\* species present in > 20% of sample plots are listed

<sup>†</sup> see **Botanical Nomenclature** link at <http://cnvc-cnvc.ca> for botanical sources, synonyms and common names

<sup>‡</sup> average percent cover of a species within the plots in which it occurs (i.e., characteristic cover)

<sup>^</sup> percent frequency occurrence for a species within the total plots

<sup>‡</sup> P<sub>x</sub> = X<sup>th</sup> percentile (e.g., P<sub>10</sub> = 10<sup>th</sup> percentile)



Forest / Forêt

Association CNVC00204

*Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp.  
 Black Spruce / Common Labrador Tea – Sheep Laurel / Reindeer Lichens  
 Épinette noire / Thé du Labrador – Kalmia à feuilles étroites / Cladonies

Site / Soil Characteristics

	Association CNVC00204 158 plots	Subassociation 204a <i>Cladina stellaris</i> 147 plots	Subassociation 204b <i>Cladina mitis</i> 11 plots
<b>Elevation Range (min–mean–max meters)</b>	45–384–820	45–391–820	60–296–590
<b>Slope Gradient (% frequency)</b>	very steep (1) steep (6) moderately steep (6) moderate (18) <b>gentle (40)</b> level (29)	very steep (1) steep (7) moderately steep (5) moderate (19) <b>gentle (39)</b> level (29)	very steep (0) steep (0) moderately steep (18) moderate (9) <b>gentle (45)</b> level (27)
<b>Aspect (% frequency)</b>	north (13) east (16) south (21) west (25) level (25)	north (14) east (16) south (21) west (24) level (24)	north (0) east (9) south (18) west (36) level (36)
<b>Meso Toposition (% frequency)</b>	<b>crest / upper (39)</b> mid (38) lower / toe (3) depression (1) level (19)	<b>crest / upper (39)</b> mid (39) lower / toe (3) depression (0) level (18)	<b>crest / upper (36)</b> mid (27) lower / toe (0) depression (9) level (27)
<b>Moisture Regime (% frequency)</b>	very dry (1) dry (8) <b>mesic (90)</b> moist (1)	very dry (1) dry (7) <b>mesic (90)</b> moist (1)	very dry (0) dry (18) <b>mesic (82)</b> moist (0)
<b>Nutrient Regime (% frequency)</b>	missing data (100)	missing data (100)	missing data (100)



***Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp.  
 CNVC00204**

**Site / Soil Characteristics (cont'd)**

	Association CNVC00204	Subassociation 204a <i>Cladina stellaris</i>	Subassociation 204b <i>Cladina mitis</i>
<b>Soil Parent Material (% frequency)</b>	bedrock (5) <b>moraine / till (65)</b> glaciofluvial (15) glaciolacustrine (11) marine (3) organic (1)	bedrock (4) <b>moraine / till (67)</b> glaciofluvial (14) glaciolacustrine (12) marine (2) organic (1)	bedrock (18) <b>moraine / till (45)</b> glaciofluvial (18) glaciolacustrine (9) marine (9) organic (0)
<b>Soil Rooting Zone Substrate (% frequency)</b>	non-soil (5) sandy (12) coarse loamy (17) fine loamy (1) silty (2) clayey (1) organic (2) missing data (60)	non-soil (4) sandy (12) coarse loamy (18) fine loamy (1) silty (2) clayey (1) organic (2) missing data (61)	non-soil (18) sandy (18) coarse loamy (9) fine loamy (9) silty (0) clayey (0) organic (0) missing data (45)
<b>Root Restricting Depth (% frequency)</b>	0 – 20 cm (14) <b>21 – 99 cm (55)</b> missing data (31)	0 – 20 cm (14) <b>21 – 99 cm (55)</b> missing data (31)	0 – 20 cm (18) <b>21 – 99 cm (55)</b> missing data (27)
<b>Humus Form (% frequency)</b>	<b>mor (99)</b> peatymor (1)	<b>mor (99)</b> peatymor (1)	<b>mor (100)</b> peatymor (0)



Canadian National Vegetation Classification (CNVC)  
Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

Forest / Forêt

Association CNVC00204

***Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp.**  
**Black Spruce / Common Labrador Tea – Sheep Laurel / Reindeer Lichens**  
**Épinette noire / Thé du Labrador – Kalmia à feuilles étroites / Cladonies**

### Additional Characteristics

Species of High Conservation Concern:

Non-native Species:

Management Issues:

### Type Statistics

Internal Similarity:

Confidence:

Strength:

### Related Concepts

#### Similar CNVC Associations:

CNVC00201 [*Pinus banksiana* (*Picea mariana*) / *Kalmia angustifolia* (*Rhododendron groenlandicum*) / *Cladina* spp.] occurs on similar sites in the same range but is dominated by *Pinus banksiana* rather than *Picea mariana*.

CNVC00205 [*Picea mariana* / *Kalmia angustifolia* – *Rhododendron canadense* / *Cladina* spp.] occurs on insular Newfoundland on comparable boreal sites. It has *Rhododendron canadense* and less *R. groenlandicum*.

CNVC00206 [*Picea mariana* / *Betula glandulosa* / *Cladina* spp.] occurs on a wide range of sites in northern Quebec and Labrador. It has less or no *Kalmia angustifolia* and more *Betula glandulosa*, *Vaccinium uliginosum* and *Empetrum nigrum*.

CNVC00211 [*Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolia* / *Pleurozium schreberi*] occurs on better sites in the same range and has greater canopy cover. It also has greater cover of feathermosses and less of *Cladina* lichens (see Dynamics).

CNVC00246 [*Picea mariana* / *Rhododendron groenlandicum* – *Vaccinium angustifolium* / *Cladina* spp.] occurs in Ontario on comparable boreal sites but has lower abundance of ericaceous shrubs and no *Kalmia angustifolia*.

#### Related United States National Vegetation Classification Associations:

#### Relationships with Other Classifications:

### Comments

CNVC00204 has physiognomic affinities to subarctic *Picea mariana* – lichen woodlands but is readily distinguished by the absence of northern species, such as *Betula glandulosa*, *Vaccinium uliginosum* and *Empetrum nigrum*.





# Canadian National Vegetation Classification (CNVC) Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

## *Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp. CNVC00204

### Source Information

**Number of source plots for CNVC00204:** 158

**Number of source plots for 204a *Cladina stellaris*:** 147

**Number of source plots for 204b *Cladina mitis*:** 11

#### Information Sources:

Ministère des Ressources naturelles, de la Faune et des Parcs, Forêt Québec. 2003. Base de données des points d'observation écologique (version 2003). Gouv. du Qué., Min. des Res. nat., de la Faune et des Parcs, Forêt Qué., Dir. des inv. for., QC.

**Concept Authors:** K. Baldwin, K. Chapman, C. Morneau

**Description Authors:** K. Chapman, K. Baldwin and J.-P. Saucier

**Date of Concept:** May, 2010

**Date of Description:** March, 2016

### Classification References:

Bergeron, J.-F.; Grondin, P.; Blouin, J. 1999. Rapport de classification écologique du sous-domaine bioclimatique de la pessière à mousses de l'ouest. Min. des Res. nat. du Qué., Dir. des inv. for., Sainte-Foy, QC.

Morneau, C. In prep. Rapport de classification écologique du sous-domaine bioclimatique de la pessière à mousses de l'est. Min. des forêts, de la Faune et des Parcs, Dir. des inv. for., QC.

### Characterization References:

Bergeron, Y.; Chen, H.Y.H.; Kenkel, N.C.; Leduc, A.; Macdonald, S.E. 2014. Boreal mixedwood stand dynamics: ecological processes underlying multiple pathways. *For. Chron.* 90(2):202-213.

Boulanger, Y.; Gauthier, S.; Burton, P.J. 2014. A refinement of models projecting future Canadian fire regimes using homogeneous fire regime zones. *Can. J. For. Res.* 44(4):365-376.

Fryer, J.L. 2014. *Picea mariana*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Strn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/picmar/all.html> (accessed: May 26, 2015).

Gagnon, R.; Morin, H. 2001. Les forêts d'épinette noire du Québec: dynamique, perturbations et biodiversité. *Nat. Can.* 125:26-35.

Gauthier, S.; Raulier, F.; Robitaille, A.; Chabot, M.; Duval, J.; Lord, D. 2013. Vulnérabilité face au risque de feu: description du critère et de l'indicateur, justification des seuils, méthode retenue et résultats détaillés. Chapitre 4 dans Rapport du Comité scientifique chargé d'examiner la limite nordique des forêts attribuables. Min. des Res. nat. du Qué., Sect. des for., QC.

Greene, D.F.; Zasada, J.C.; Sirois, L.; Kneeshaw, D.; Morin, H.; Charron, I.; Simard, M.J. 1999. A review of the regeneration dynamics of North American boreal forest tree species. *Can. J. For. Res.* 29:824-839.

Jobidon, R. 1995. Autécologie de quelques espèces de compétition d'importance pour la régénération forestière au Québec. *Revue de littérature*. Min. des Res. nat., Dir. de la rech. for., QC. Mémoire de recherche forestière n° 117.

Kenkel, N.C.; Walker, D.J.; Watson, P.R.; Caners, R.T.; Lastra, R.A. 1997. Vegetation dynamics in boreal forest ecosystems. *Coenoses* 12(2-3):97-108.

Mallik, A.U. 2003. Conifer regeneration problems in boreal and temperate forests with ericaceous understory: role of disturbance, seedbed limitation, and keystone species change. *Crit. Rev. Plant Sci.* 22(3&4):341-366.

Mansuy, N.; Gauthier, S.; Robitaille, A.; Bergeron, Y. 2010. The effects of surficial deposit-drainage combinations on spatial variations of fire cycles in the boreal forest of eastern Canada. *Int. J. Wildland Fire* 19:1083-1098.

Ministère des Ressources naturelles. 2013. Le guide sylvicole du Québec, Tome 1, Les fondements biologiques de la sylviculture. Ouvrage collectif sous la supervision de B. Boulet et M. Huot. Les Publications du Québec, QC. 1044.



Canadian National Vegetation Classification (CNVC)  
Classification nationale de la végétation du Canada (CNVC)

<http://cnvc-cnvc.ca>

***Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp.  
CNVC00204**

**Characterization References (cont'd):**

Ministère des Ressources naturelles du Québec, Forêt Québec. 2002+. Les guides de reconnaissance des types écologiques. Gouv. du Québec, Québec, QC. Available: <http://www.mffp.gouv.qc.ca/forets/inventaire/guide-types-ecologiques-carte.jsp> (accessed: May 2015).

Morneau, C.; Payette, S. 1989. Postfire lichen-spruce woodland recovery at the limit of the boreal forest in northern Quebec. *Can. J. Bot.* 67:2770-2782.

Munger, G.T. 2008. *Cladonia* spp. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/lichens/claspp/all.html> (accessed: May 28, 2015).

Payette, S.; Bhiry, N.; Delwaide, A.; Simard, M. 2000. Origin of the lichen woodland at its southern range limit in eastern Canada: the catastrophic impact of insect defoliators and fire on the spruce-moss forest. *Can. J. For. Res.* 30:288-305.

Simard, M.; Payette, S. 2005. Reduction of black spruce seed bank by spruce budworm infestation compromises postfire stand regeneration. *Can. J. For. Res.* 35:1686-1696.

The information contained in this factsheet is based on data and expert knowledge that is current to the date of description. As new information becomes available, the factsheet will be updated.

For more information about the contents of this factsheet and definitions of attribute names and data classes, see the **Understanding the Factsheet** link at <http://cnvc-cnvc.ca>.

**Suggested Citation:** K. Chapman, K. Baldwin and J.-P. Saucier. *Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolium* / *Cladina* spp. [online]. Sault Ste. Marie, Ontario, Canada: Canadian National Vegetation Classification. March, 2016; generated Jun/14/2016; cited ENTER DATE ACCESSED. 10 p. Canadian National Vegetation Classification Association: CNVC00204. Available from <http://cnvc-cnvc.ca>. System Requirements: Adobe Acrobat Reader v. 7.0 or higher. ISSN 1916-3266.